

# CRS Report for Congress

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## The National Aeronautics and Space Administration: Overview, FY2006 Budget in Brief, and Key Issues for Congress

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### Summary

The National Aeronautics and Space Administration (NASA) conducts U.S. civilian space activities. For FY2006, NASA requested \$16,456.3 million. Congress appropriated \$16,456.8 million, \$500,000 above the request, in the FY2006 Science, State, Justice, Commerce appropriations act (P.L. 109-108), subject to a 0.28% rescission in that act, and a 1% rescission in another appropriations act (P.L. 109-148). The latter act also adds \$350 million for NASA for hurricane recovery. Congress passed a FY2007-2008 NASA authorization act (P.L. 109-155) that does not include FY2006 funding. This is the final edition of this report.

### Agency Overview

The National Aeronautics and Space Administration (NASA) was created by the 1958 National Aeronautics and Space Act (P.L. 85-568). NASA conducts civilian space and aeronautics activities. NASA opened its doors on October 1, 1958, almost exactly one year after the Soviet Union ushered in the Space Age with the launch of the world's first satellite, Sputnik, on October 4, 1957. In the more than 47 years since, NASA has conducted far reaching programs in human and robotic spaceflight, technology development, and scientific research.

Dr. Michael Griffin is the Administrator of NASA. The agency is managed from NASA Headquarters in Washington, D.C. Links to NASA's four Mission Directorates (Aeronautics Research, Exploration Systems, Science, and Space Operations), and individual NASA programs, are at [<http://www.hq.nasa.gov/hq/org.html>]. NASA has nine major field centers: **Ames Research Center**, Moffett Field, CA; **Dryden Flight Research Center**, Edwards, CA; **Glenn Research Center**, Cleveland, OH; **Goddard Space Flight Center**, Greenbelt, MD; **Johnson Space Center**, near Houston, TX; **Kennedy Space Center**, near Cape Canaveral, FL; **Langley Research Center**, Hampton, VA; **Marshall Space Flight Center**, Huntsville, AL; and **Stennis Space Center**, in Mississippi, near Slidell, LA. The **Jet Propulsion Laboratory**, Pasadena, CA, is a

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Federally Funded Research and Development Center operated for NASA by the California Institute of Technology. According to NASA, the agency has approximately 19,000 civil servants [<http://nasapeople.nasa.gov/Workforce/data/page7.htm>].

## NASA's FY2006 Budget Request

NASA requested \$16,456.3 million, a 2.4% increase over the \$16,070.4 million appropriated in the FY2005 Consolidated Appropriations Act (adjusted for the rescission). NASA also received \$126 million in a FY2005 supplemental for hurricane relief, giving it a total of \$16,196.4 million for FY2005. The FY2006 request was 1.6% more than that total. NASA substantially changed its budget structure again in the FY2006 request (see footnotes to **Table 1**). NASA submitted a budget amendment on July 15; the total amount requested for the agency did not change, only how it is allocated within the agency.

**Table 1. NASA's FY2006 Budget**  
(Budget Authority, in millions of dollars)

Category	FY2005 Estimate*	FY2006 Request (Amended)	SSJC Approps			NASA Auth†	
			House passed	Senate passed	Final**	Senate passed	House passed
<b>Science, Aero., and Expl.</b>	<b>***7,681</b>	<b>***9,829</b>	<b>9,726</b>	<b>9,761</b>	<b>9,761</b>	<b>9,661</b>	
Science <sup>a</sup>	5,527	5,341				5,341	
Aeronautics	906	852					
Biological and Physical Research	1,004	— <sup>b</sup>					
Exploration Systems	25	3,468					
Education	217	167					
<b>Exploration Capabilities</b>	<b>***8,358</b>	<b>***6,595</b>	<b>6,713</b>	<b>6,603</b>	<b>6,663</b>	<b>6,863</b>	
Space Operations	6,704	6,595					
- <i>Space Shuttle</i>	4,543	4,531					
- <i>International Space Station</i>	1,676	1,689					
- <i>Space and Flight Support</i>	485	376					
Exploration Systems	1,654	— <sup>c</sup>					
<b>Inspector General</b>	<b>31</b>	<b>32</b>	<b>32</b>	<b>32</b>	<b>32</b>	<b>32</b>	
<b>Total</b>	<b>16,070</b>	<b>16,456</b>	<b>16,471</b>	<b>16,396</b>	<b>16,457</b>	<b>16,556</b>	<b>16,966</b>
<b>2004 Hurricane Suppl.</b>	<b>126</b>						
<b>Grand total</b>	<b>16,196</b>	<b>16,456</b>	<b>16,471</b>	<b>16,396</b>	<b>16,457</b>	<b>16,556</b>	<b>16,966</b>

**Sources:** Office of Management and Budget, NASA FY2006 budget request documents, and House and Senate bills and committee reports.

**Note:** Totals may not add due to rounding. Some of the fields are blank because the committee bills and reports do not provide requisite data.

a. In the FY2006 request, "Science" incorporates the former Space Science and Earth Science line items.

b. In the FY2006 request, Biological and Physical Research became part of Exploration Systems.

c. In the FY2006 request, funding for Exploration Systems was moved into the SA&E account.

\* Figures in this column are from NASA's Initial Operating Plan (IOP) and are not final. Several operating plan updates have been submitted, but are not in a budget format compatible with the FY2006 budget.

\*\* Does not reflect across-the-board rescissions or hurricane-related augmentations.

\*\*\* The FY2005 totals for the SA&E and Exploration Capabilities accounts are different from those in the table included in NASA's FY2006 budget justification documents because OMB shows the shift of "Exploration Systems" from one account to the other. The NASA table uses the FY2006 budget structure without showing that trace. Hence the OMB data are used in this report.

† The final version of the NASA authorization act does not cover FY2006; only FY2007-2008.

NASA's FY2006 funding is a combination of \$16.456 billion provided in the FY2006 Science, State, Justice, Commerce (SSJC) Appropriations Act ( P.L. 109-108), minus a 0.28% across-the-board rescission in that act, minus a 1% across-the-board rescission in the FY2006 Department of Defense appropriations and hurricane recovery act (P.L. 109-148), plus \$350 million added for NASA for hurricane recovery in P.L. 109-148. The conference report on the SSJC appropriations bill (H.R. 2862, H.Rept. 109-272) has a **net** increase of \$500,000 (\$16,456.8 million, compared with the \$16,456.3 million request). Among the **increases** above the request are \$280 million for congressionally directed priorities, \$60 million for aeronautics, \$50 million for the Hubble servicing mission, \$30 million for the Glory earth science mission, \$20 million for the National Center for Advanced Manufacturing, \$20 million for alternative small spacecraft technology, \$15 million for the Propulsion Research Lab, \$15 million for earth science competitive grants, \$12.2 million for the Space Grant program, \$10 million for the Space Interferometry Mission, \$10 million for the Institute for Scientific Research, \$8.2 million for EPSCoR, \$5 million for a Heavy Lift Launch Vehicle, and \$5 million for the Living with a Star solar-terrestrial physics program. Among the **decreases** are \$200 million from Project Prometheus; a \$90 million general reduction from the Science, Aeronautics and Exploration account; \$34 million from the Centennial Challenges program; \$26 million from corporate G&A expenses; \$25 million from exploration research and technology; \$25 million from human systems research and technology; \$25 million from the Discovery program; \$15 million from optical communications; \$80 million from the International Space Station (including \$60 million from the ISS Crew/Cargo Services line); \$10 million from space communications; and \$10 million generally from the Exploration Capabilities account.

Congress also passed a FY2007-2008 NASA authorization act (P.L. 109-155) in 2005. It authorizes \$17.9 billion for FY2007, and \$18.7 billion for FY2008. Since the final version does not cover FY2006 funding, its funding provisions are not discussed further in this report.

NASA submitted a budget amendment on July 15, 2005 that reflected, in part, its decision to move two programs into the Exploration Systems line — ISS Crew/Cargo Services (\$168 million) was moved from the International Space Station, and the Lunar Robotic Exploration Program (\$135 million) was moved from the Science Mission Directorate. The total amount requested for the agency for FY2006 was the same as the original request. Other changes were made within those accounts in the budget amendment and in updates to NASA's FY2005 operating plan (see CRS Report RL32988). Separately, two NASA facilities in or near New Orleans, LA, were damaged by Hurricane Katrina: the Stennis Space Center, and the Michoud Assembly Facility, operated for NASA by Lockheed Martin. NASA estimates that it will cost \$760 million to repair damages and relocate staff. The agency shifted \$100 million in FY2005 funds

to begin hurricane recovery efforts. The Administration requested \$324.8 million for NASA for hurricane relief. The FY2006 DOD appropriations and hurricane recovery act (P.L. 109-148) increased that to \$350 million.

## **President Bush's "Vision for Space Exploration"**

On January 14, 2004, President George W. Bush announced a new Vision for Space Exploration, directing NASA to focus its efforts on returning humans to the Moon by 2020, and someday sending them to Mars and "worlds beyond." The Vision involves both robotic and human space missions, and other countries were invited to participate. For more information, see CRS Report RS21720. The President proposed adding only \$1 billion to NASA's five-year (FY2005-2009) budget for the Vision. The remainder of the required funding is to be redirected from other NASA activities, for example by terminating the space shuttle program in 2010, and ending U.S. use of the International Space Station in 2016. At the time of the speech, NASA issued a "sand chart" with projected NASA budgets through FY2020, but did not offer a cost estimate for the Vision. Later in 2004, NASA stated that returning humans to the Moon would cost \$64 billion (2003 dollars) for FY2004-FY2020, not including robotic probes. A cost estimate for sending people to Mars was not provided. Under the Vision, NASA is to develop a new spacecraft, the Crew Exploration Vehicle (CEV), to take astronauts to and from the Moon, with an Earth-orbit capability by 2014. On September 19, 2005, NASA released its implementation plan for the Vision, setting a goal of having the CEV ready by 2012, and estimating the cost of returning humans to the Moon at \$104 billion through 2018. (That figure does not include another \$20 billion for using the CEV to service the International Space Station.)

The President's speech came almost one year after the space shuttle *Columbia* tragedy that killed seven astronauts (see CRS Report RS21408). One of the conclusions of the chairman of the *Columbia* Accident Investigation Board (CAIB), Harold Gehman, was that the nation needs an "agreed vision" that NASA can execute. President Bush's announcement initiated the process of finding an "agreed vision." Whether or not a consensus has emerged is debatable. Supporters point to Gallup polls in 2004 and 2005 that showed strong public support, but others note that the polls were sponsored by the Coalition for Space Exploration, a group of companies and organizations that support the Vision [<http://www.spacecoalition.org>]. Supporters also point to congressional action funding the Vision as an endorsement. Congressional committees, however, have stressed that while they agree with the "Moon/Mars" goal, they also think NASA should maintain a balanced set of program including science and aeronautics, not focus specifically on human exploration. NASA's FY2006 appropriations act (P.L. 109-108) cut the following Vision-related programs: \$25 million from each of the two Exploration Systems research and technology subaccounts; all \$34 million from Centennial Challenges (to award prizes for innovative technological developments); and \$200 million from Project Prometheus (to develop space nuclear power and propulsion). Conferees added \$5 million for a "heavy lift" launch vehicle. The FY2007-2008 NASA authorization act (P.L. 109-155) specifies that, beginning in FY2007, NASA is to use a budget structure that separates "exploration systems" from science, aeronautics, and education. That would make it more difficult for NASA to shift funds from the latter programs into the "Moon/Mars" human exploration program.

## Key Congressional Issues

### The Relative Priority of NASA in the Federal Budget

With the current emphasis on cutting spending to reduce the federal budget deficit, and the funding requirements associated with hurricane recovery, some may question the amount of money proposed for NASA in FY2006 and beyond. Space program advocates often cite the small percentage of federal budget authority that is allocated to NASA — 0.7 % in FY2005 — as an indication that it is not a significant factor in the nation's overall spending. The Coalition for Space Exploration points out that benefits accrue from space exploration in terms of stimulating children to study math and science, and driving invention, which supports a robust economy. Skeptics counter that spending more than \$16 billion on NASA is a luxury when many domestic discretionary programs are being cut, and federal R&D spending overall is not keeping pace with inflation.

### The Relative Priority of the Vision Versus Other NASA Activities

**Funding.** The President's plan calls for most of the funding for the Vision to come from redirecting spending from other NASA activities. In the 2004 "sand chart" (discussed earlier), the programs that are not included in the Vision were labeled *Aeronautics and Other Science Programs*. Funding for those activities, including aeronautics, earth science, and certain space science programs, was shown as remaining flat through FY2020. Advocates of those programs worried that funding for their research would suffer. NASA Administrator Griffin, who assumed office in April 2005, stated that he would not take funds from space science, earth science, or aeronautics programs to pay for the Vision (although he is cutting funding for life and materials sciences research that was to be conducted aboard the ISS). The committee reports accompanying the House and Senate NASA appropriations bills, and the FY2007-2008 NASA authorization act (P.L. 109-155) express support for the Vision, but as part of a balanced program that includes science and aeronautics. It should be noted that current budget constraints at NASA are due not only to the need to fund the Vision, but also to cost growth in existing NASA programs (including several science missions), the cost of returning the space shuttle to flight status, and the need to fund congressionally directed items.

**Workforce and Institutional Issues.** Funding for various NASA activities also will affect NASA workforce levels. NASA officials insist that there are no plans to close any NASA centers. However, NASA's FY2006 budget request assumed that the number of budgeted civil service full time equivalents (FTEs) would drop from 19,227 in FY2005 to 16,738 by the end of FY2006. How to "right size" NASA, its facilities, and its workforce, and ensure NASA has the necessary skill mix for the Vision, are among the issues facing Congress. The FY2006 appropriations act that includes NASA (P.L. 109-108) restricts NASA's use of buyouts and Reductions in Force (RIFs) prior to NASA providing certain reports to Congress. The FY2007-2008 NASA authorization act (P.L. 109-155) prohibits RIFs or other involuntary separations (except for cause) prior to March 16, 2007.

## The Future of the Space Shuttle and International Space Station

The Vision calls for the space shuttle fleet to be retired in 2010, when ISS construction is expected to be completed. NASA Administrator Griffin emphasizes his intention to meet that deadline. Placing a fixed termination date on the shuttle system, however, may create schedule pressure similar to what the CAIB found to have contributed to the *Columbia* accident (see CRS Report RS21408). One alternative is to fly the shuttle until a replacement is available. Another is to specify how many more shuttle flights are needed, and continue the system until those requirements are met, whenever that is. The FY2007-2008 NASA authorization act (P.L. 109-155) states that it is U.S. policy to possess the capability for human access to space on a continuous basis, and directs the NASA Administrator to make a number of related reports to Congress in future years. President Bush directed NASA to build the CEV, which will replace the shuttle, so that it would be available by 2014. Dr. Griffin hopes to accelerate that to 2012, thereby reducing the gap between the end of the shuttle and availability of the CEV. During such a gap, the United States would be dependent on Russia to take American crews to and from ISS.

NASA officials have indicated that NASA plans to complete its use of the ISS in 2016. Under the Vision, the only U.S. research that would be conducted on ISS is that needed to fulfill the Vision. NASA is downscaling its ISS research plan accordingly. NASA spends about \$2 billion a year on ISS, in addition to the costs of the shuttle program. Some question whether ISS is worth that investment considering the modest research opportunities that remain. Others want to restore the ISS research program to what was previously planned. NASA is building ISS in partnership with Canada, Japan, Russia, and 10 European countries. Fulfilling U.S. commitments to those partners may be a sufficient rationale for continued U.S. involvement. The FY2007-2008 NASA authorization act (P.L. 109-155) directs that 15% of ISS research spending be used for non Vision-related research. The final FY2006 appropriations act that includes NASA, P.L. 109-108, cut \$80 million from the ISS program.

## The Future of the Hubble Space Telescope

Two days after the President's Vision speech, NASA announced that it would not use the shuttle to conduct further servicing missions to the Hubble Space Telescope (see CRS Report RS21767). Then-Administrator Sean O'Keefe cited shuttle safety concerns as the primary reason. Widespread criticism led NASA to explore the possibility of a robotic servicing mission. A December 2004 report from the National Research Council, however, concluded that a robotic servicing mission was not likely to succeed in the time available. In the FY2006 request, NASA requested money only for a deorbit mission (to ensure that Hubble reenters from orbit without posing danger to populated areas). Dr. Griffin pledged to revisit the shuttle servicing decision after the shuttle completes its two "Return to Flight" mission. The FY2006 appropriations act that includes NASA (P.L. 109-108) added \$50 million for a Hubble servicing mission, which the accompanying conference report (H.Rept. 109-272) said would bring the total available for Hubble in FY2006 to \$271 million.